

Name:

Period:

Date:

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Math Lab: Graphing Exponential Functions

Exponential functions are ones in which the variable is in the exponent. As with other types of functions, there is a parent graph for exponential functions ($y = b^x$ where b is the base) and we can create other similarly shaped graphs using transformations.

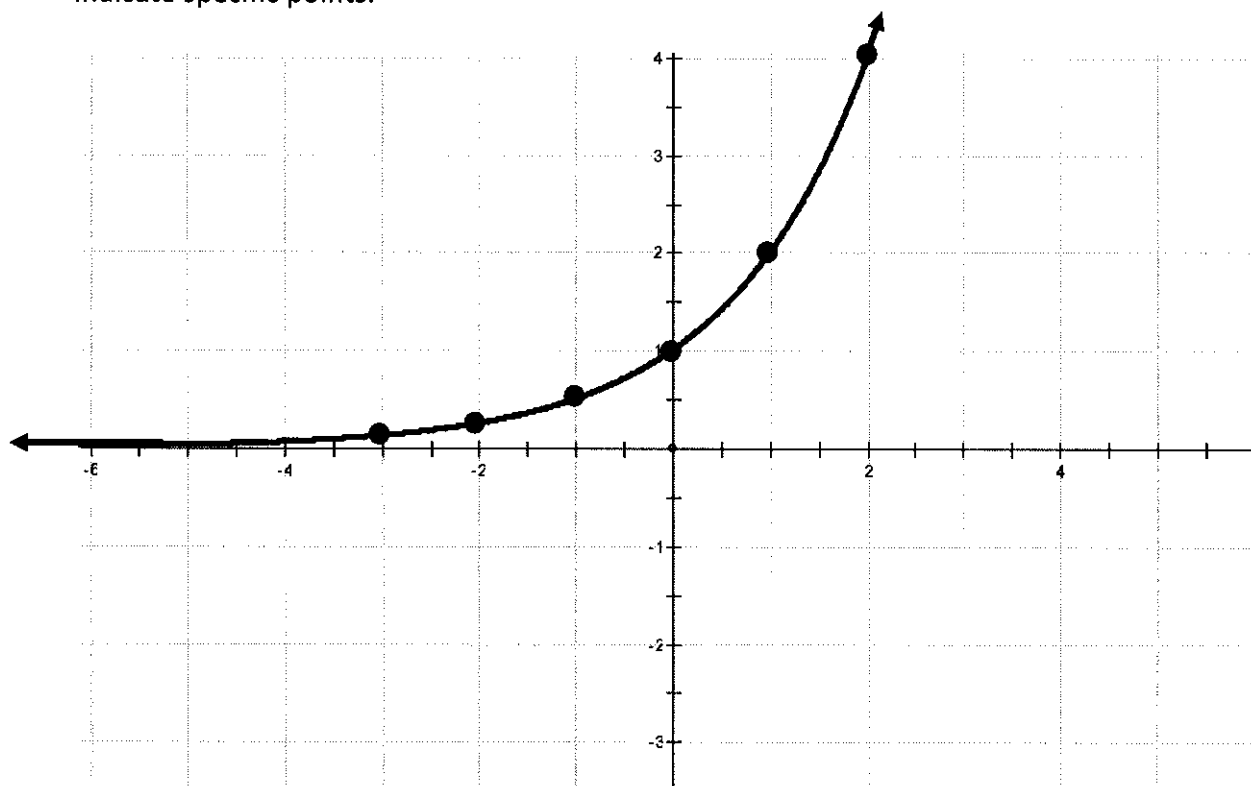
Consider the parent function $y = 2^x$. Complete the table to the right.

Is there ever any value of x that will make $y = 0$?

Is there ever any value of x that will make y negative?

X	Y
-2	
-1	
0	
1	
2	
3	

The graph of $y = 2^x$ is shown. Graph $y = 3^x$ in red and $y = 4^x$ in blue; be sure your graphs indicate specific points.



Find the domain and range for each.

$$y = 2^x$$

$$y = 3^x$$

$$y = 4^x$$

Domain:

Domain:

Domain:

Range:

Range:

Range:

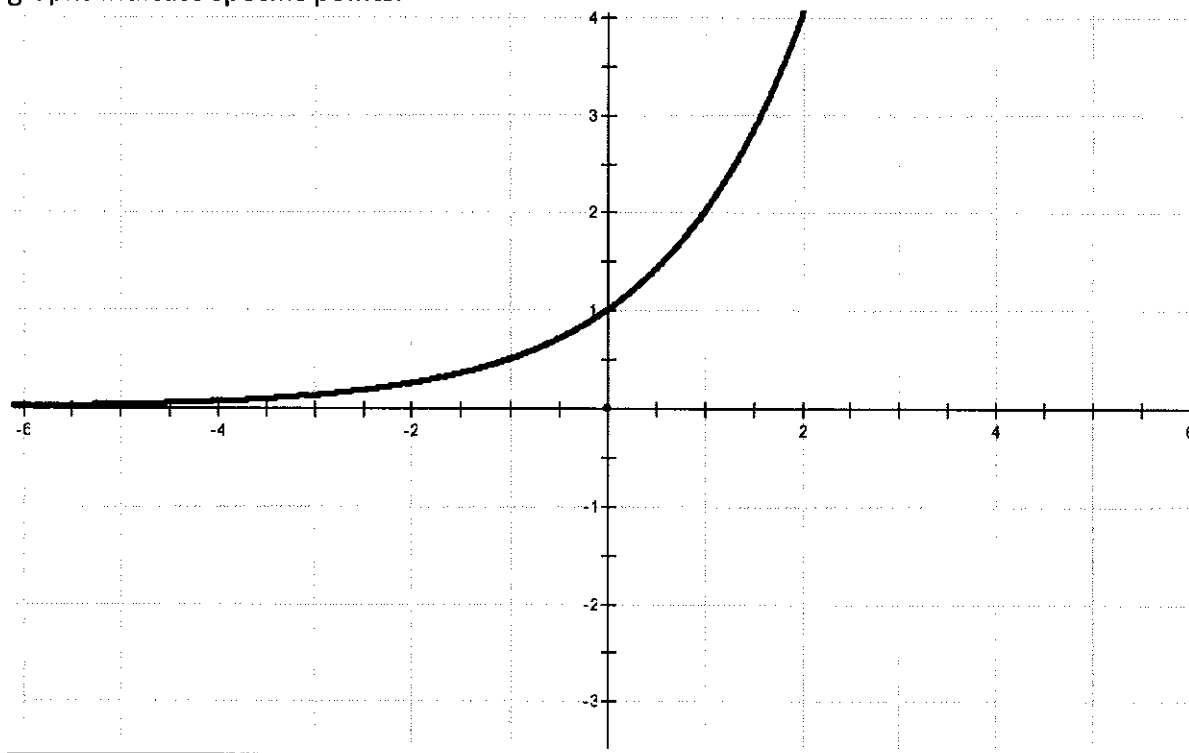
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What affect does changing the base of the parent graph to any number greater than 1 have on the graph?

The graph of $y = 2^x$ is shown. Graph $y = 2^x + 2$ in red and $y = 2^x - 2$ in blue; be sure your graphs indicate specific points.



Find the domain and range for each.

$$y = 2^x$$

Domain:

Range:

Horizontal Asymptote at:

$$y = 2^x + 2$$

Domain:

Range:

Horizontal Asymptote at:

$$y = 2^x - 2$$

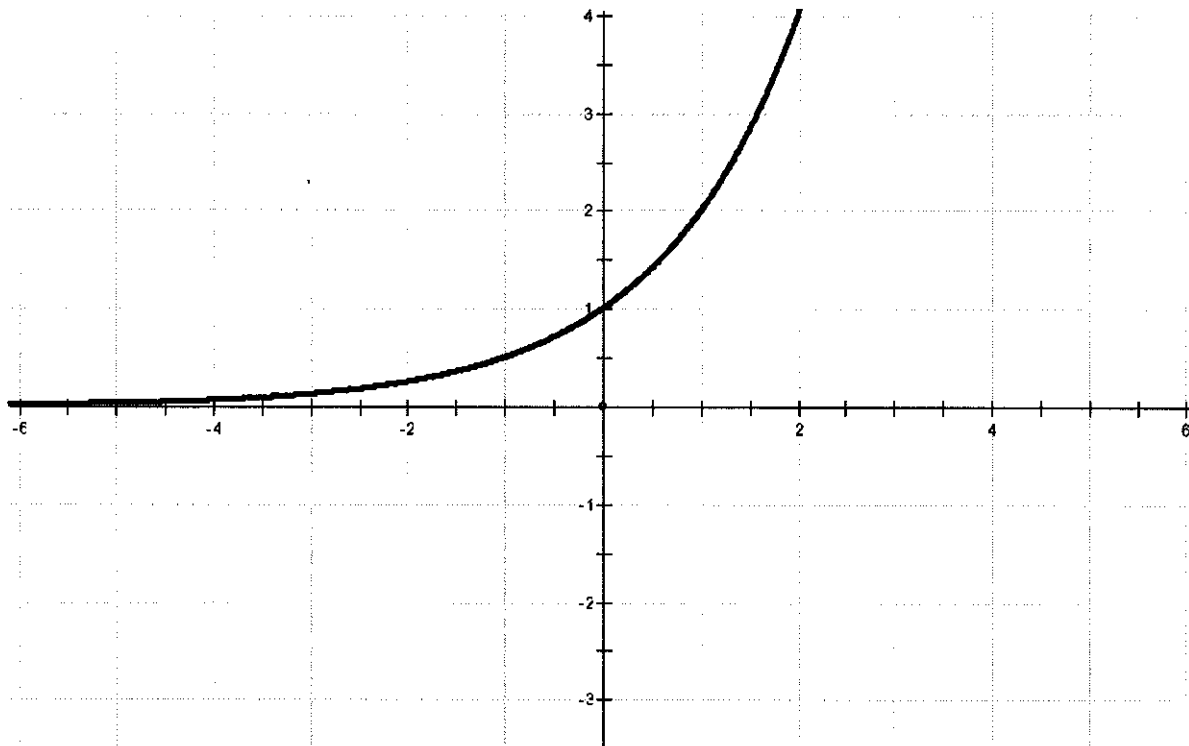
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Range:

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What affect does adding or subtracting a value "outside" the x have on the graph of the exponential function?

The graph of $y = 2^x$ is shown. Graph $y = 2^{x+2}$ in red and $y = 2^{x-2}$ in blue; be sure your graphs indicate specific points.



Find the domain and range for each.

$$y = 2^x$$

Domain:

Range:

Horizontal Asymptote at:

$$y = 2^{x+2}$$

Domain:

Range:

Horizontal Asymptote at:

$$y = 2^{x-2}$$

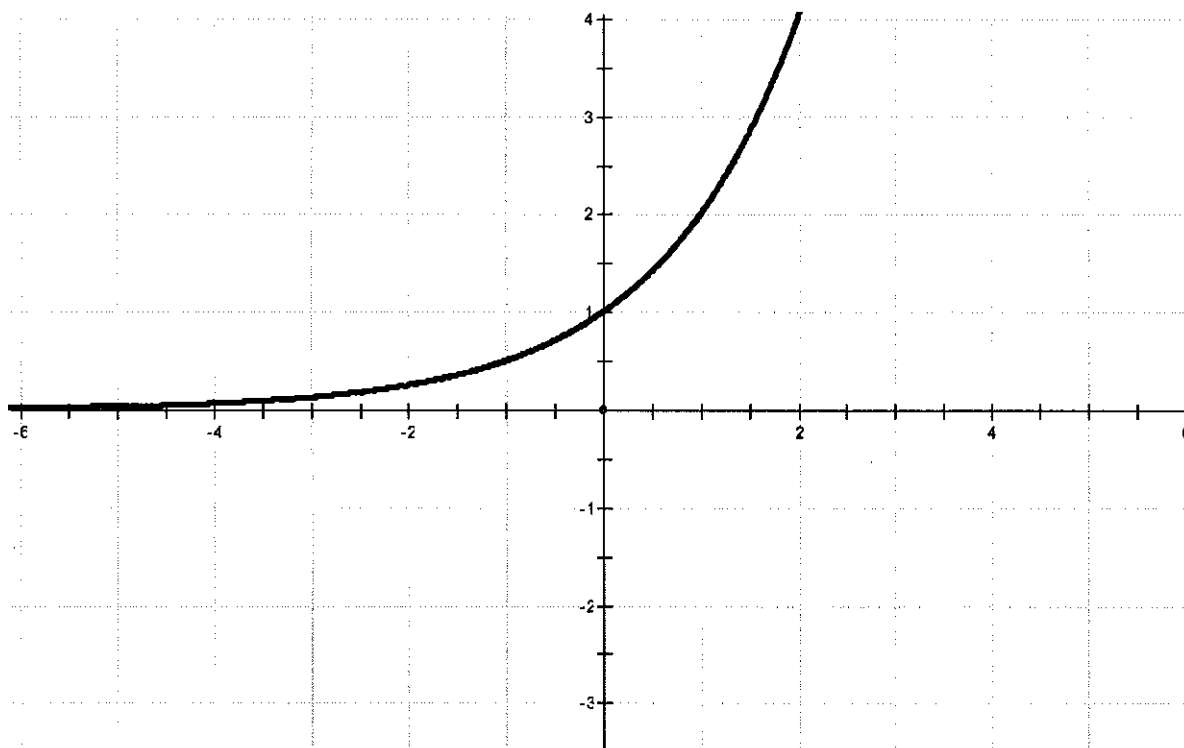
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Horizontal Asymptote at:

What affect does adding or subtracting a value from x have on the graph of the exponential function?

The graph of $y = 2^x$ is shown. Graph $y = 2^{2x}$ in red and $y = 2^{1/2x}$ in blue; be sure your graphs indicate specific points.



Find the domain and range for each.

$$y = 2^x$$

Domain:

Range:

Horizontal Asymptote at:

$$y = 2^{2x}$$

Domain:

Range:

Horizontal Asymptote at:

$$y = 2^{1/2x}$$

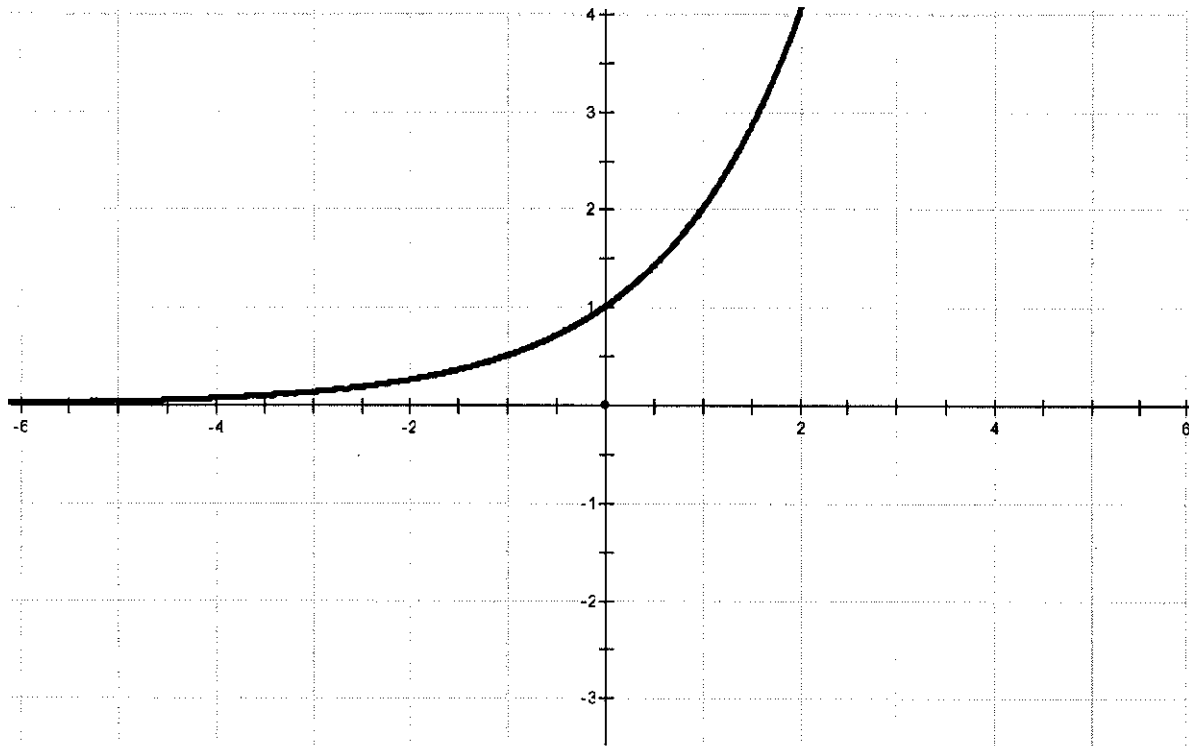
Domain:

Range:

Horizontal Asymptote at:

What affect does multiplying x by a value have on the graph of the exponential function?

The graph of $y = 2^x$ is shown. Graph $y = -2^x$ in red and $y = 2^{-x}$ in blue; be sure your graphs indicate specific points.



Find the domain and range for each.

$$y = 2^x$$

Domain:

Range:

Horizontal Asymptote at:

$$y = -2^x$$

Domain:

Range:

Horizontal Asymptote at:

$$y = 2^{-x}$$

Domain:

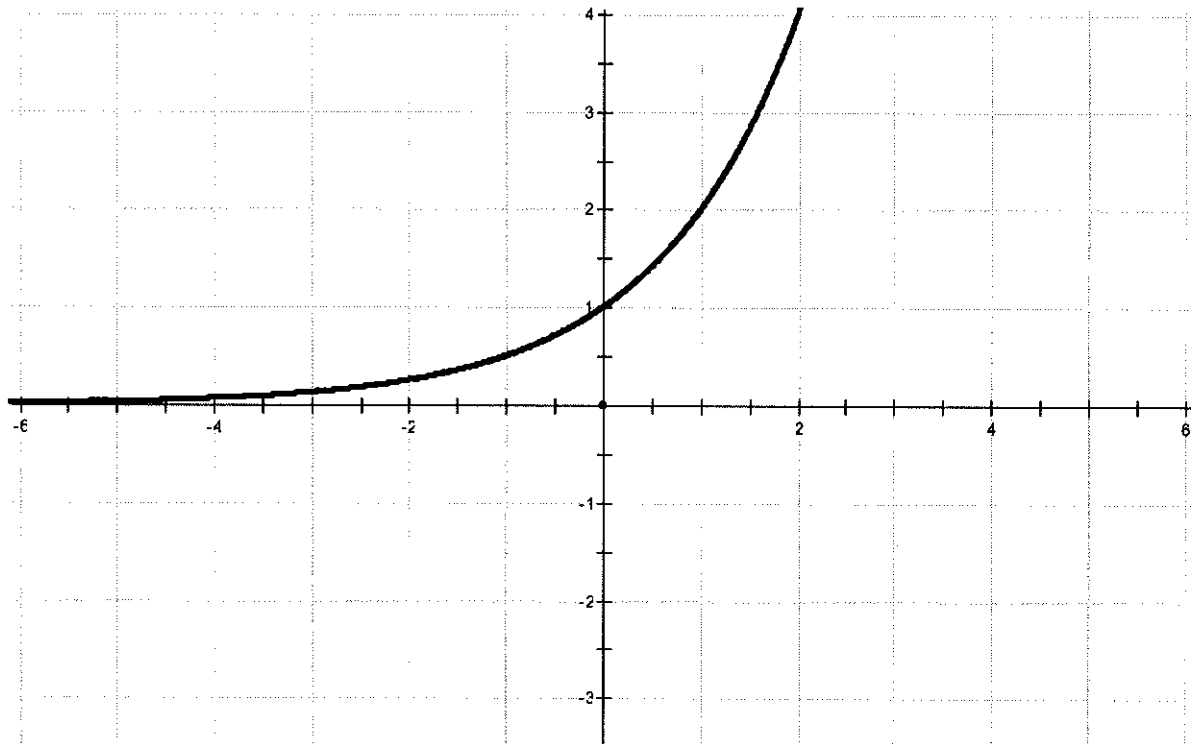
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What affect does multiplying x by a negative have on the graph of the exponential function?

What affect does multiplying by a negative out front have on the graph?

The graph of $y = 2^x$ is shown. Graph $y = \left(\frac{1}{2}\right)^x$ in red and $y = \left(\frac{1}{4}\right)^x$ in blue.



Find the domain and range for each.

$$y = 2^x$$

Domain:

Range:

Horizontal Asymptote at:

$$y = \left(\frac{1}{2}\right)^x$$

Domain:

Range:

Horizontal Asymptote at:

$$y = \left(\frac{1}{4}\right)^x$$

Domain:

Range:

Horizontal Asymptote at:

What effect does changing the base to a number between 0 and 1 have on the graph?